

# Network Description and Configuration for Native Deployment

## Ericsson Dynamic Activation 1

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### DESCRIPTION

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# 1 Introduction

This document gives detailed information about the network configuration of the Ericsson Dynamic Activation (EDA), using GEP3 or GEP5 blades.

It refers to the configuration of the following equipment:

- Generic Ericsson Processor board, third generation (GEP3) or fifth generation (GEP5)
- System and Control Switch (SCX) blades
- Component Main Switch (CMX) routers

## 1.1 Purpose and Scope

This section contains information about what is in scope and what has been left out.

### 1.1.1 In Scope

- Network Infrastructure Overview.
- Logical subnetworks: application-related traffic network and Operation Administration and Maintenance (OAM) network.
- Connectivity (logical and IP design).
- Configuration information for switches, routers, and cluster.
- System Control (SC) nodes with Payload (PL) nodes using GEP3 or GEP5, SCX switches, and CMX routers.
- Support of active - standby configuration using Virtual Router Redundancy Protocol (VRRP) and active - active configuration using Bidirectional Forwarding Detection (BFD).

### 1.1.2 Out of Scope

- Dynamic Activation application software configurations.
- Parts of the configuration of the customer network outside the system.
- Simple Network Management Protocol (SNMP) configurations for the switches and the routers.



## 1.2 Target Groups

The target groups for this document are as follows:

- System Administrator
- Network Administrator
- Network Supervision Administrator

For more detailed information about the target groups presented in the list above, see *Library Overview*, Reference [1].

## 1.3 Typographic Conventions

Typographic conventions are described in the document *Library Overview*, Reference [1].

For information about abbreviations used throughout this document, see *Glossary of Terms and Acronyms*, Reference [2].

## 1.4 Reader's Guideline

All example configurations throughout this document refer to a maximum configuration of 12 GEP blades.

## 1.5 System Naming

Throughout this document, the following applies, for both BFD and VRRP setup:

- PROV\_OM\_CN refers to provisioning traffic.
- OM\_CN\_SP refers to OAM traffic.

### 1.5.1 Switches

- SCX-0-0, left SCXB in subrack 0
- SCX-0-25, right SCXB in subrack 0

### 1.5.2 Routers

- CMX-0-26, left CMXB in subrack 0
- CMX-0-28, right CMXB in subrack 0



### 1.5.3

#### Port Definitions

- SCX: BP1, BP3, GE1, E1...
- CMX: E1, E2, E3, GE1, GE2...







## 2 Networks

The network infrastructure components of Dynamic Activation are duplicated to provide redundancy. The active infrastructure consists of two CMX boards and two SCX boards. The CMXs connect Dynamic Activation to the customer network.

The SCXs handles the following:

- NTP
- Boot
- DMX controller (DMXC)

The CMX is a component that implements a standards compliant managed multi-layer switch that primarily provides Bridging and/or Routing services between its switched Ethernet ports.

CMX provides virtual routing functionality, meaning that one router handles provisioning traffic (PROV\_OM\_CN) and the other handles operation and maintenance traffic (OM\_CN\_SP).

The SCX pair is managed as one unit through the BSP software, which is installed on both SCXs. The BSP information is available in [http://calstore.internal.ericsson.com/alexserv?li=EN/LZN7800024\\*](http://calstore.internal.ericsson.com/alexserv?li=EN/LZN7800024*).

Dynamic Activation network setup does not depend on L2 ring topology for fault tolerance. That is, no STP protocol is running and no L2 loops exist in the setup.

Under normal conditions, traffic sourced by the VIPs, VIP-TRAFFIC-IP, and VIP-OAM-IP, will exit from CMX-0-26.

### 2.1 External Physical Connectivity

The external connectivity uses either one physical cable (10 Gb bandwidth) or two physical cables (1 Gb bandwidth) from each CMX:

- When using one cable from each CMX, the provisioning traffic and OAM traffic will be logically separated. This is visible in Figure 1. This cable needs to be connected to an Active Patch Panel (APP) for converting copper to fiber.
- When using two cables from each CMX, the provisioning traffic and OAM traffic will be physically separated. This is visible in Figure 2.

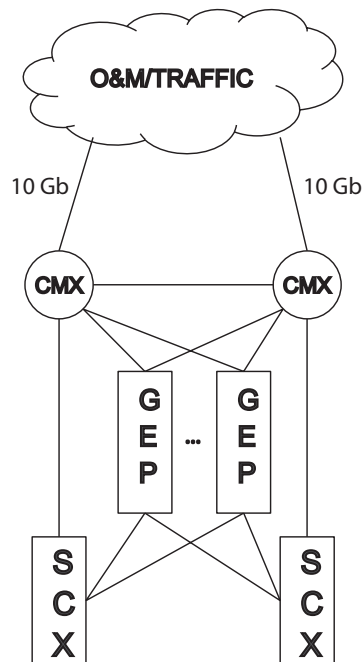


Figure 1 Dynamic Activation Connectivity Overview, one Cable

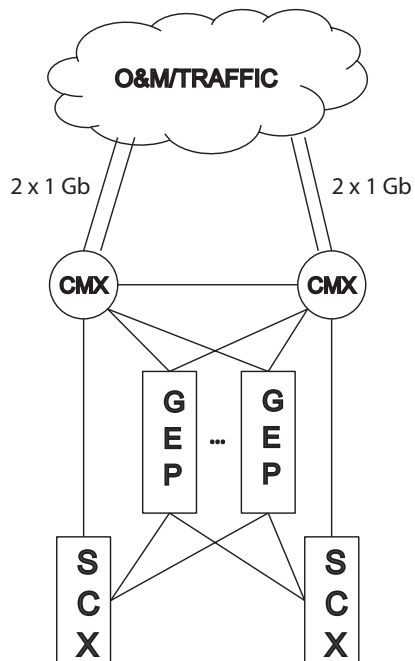


Figure 2 Dynamic Activation Connectivity Overview, two Cables

For more detailed information regarding Dynamic Activation physical connectivity, see *Hardware Installation and IP Infrastructure Setup for Native Deployment GEP5*, Reference [5] if using GEP5, or, if using GEP3, *Hardware Installation and IP Infrastructure Setup for Native Deployment GEP3*, Reference [6].

## 2.2 External Connectivity L2

Two VLANs are used externally, one VLAN for provisioning traffic and one VLAN for OAM.

For more detailed information regarding the network setup, see Section 8 on page 31.

## 2.3 External Connectivity L3

Dynamic Activation supports the following L3 resilience alternatives for customer network connectivity:

- VRRP
- BFD

**Note:** Only one alternative can be used. The choice between VRRP and BFD depends on the customer network and is agreed with the customer.

The following table shows addresses used in external communication.

*Table 1 Dynamic Activation Addresses in External Communication*

Address	VLAN Name	Description
VIP-TRAFFIC-IP	-	IP for provisioning traffic destined to Dynamic Activation. This is also used as source IP for application traffic.
VIP-OAM-IP	-	IP for OAM traffic destined to Dynamic Activation (GUI, SSH, SNMP). This is also used as source IP for DNS traffic.
-	PG_OM_SP1	OAM network to access individual GEP blades (SSH), only on SC blades.
-	PROV_OM_CN	Link network(s) for application traffic external connectivity.
-	OM_CN_SP	Link network(s) for Dynamic Activation OAM external connectivity.

From customer network, VIP-TRAFFIC-IP is to be routed through the external VLAN PROV\_OM\_CN.

From customer network, VIP-OAM-IP is to be routed through the external VLAN OM\_CN\_SP.

VIP addresses is a single host subnet (/32) and must not be located in the same network as the uplink subnets.



## 2.4 IP Subnet Allocation

Within the solution, an IP addressing schema is used as described in Table 2. Subnets used only within the system are allocated within a 169.254.0.0/16 and 192.168.0.0/16 private networks. Subnets of type 'Private' are not available for external applications.

*Table 2 IP Subnet Allocation*

VLAN Name	VLAN ID	Subnet	Mask	Type	Use	Comments
pg_boot_pdl	4004	169.254.69.0	/24	Private	Boot network	Boot via SCX-0-0
pg_boot_pdr	4014	169.254.70.0	/24	Private	Boot network	Boot via SCX-0-25
pg_lde_sp	4024	169.254.100.0	/24	Private	Backplane Connectivity (bond0)	ARP-MONITORING
pg_Control-L	54	192.168.14.0	/24	-	NTP Server Left	-
pg_Control-R	64	192.168.15.0	/24	-	NTP Server Right	-
pg_prov_sp1	104	192.168.101.0	/29	Private	Traffic VIP link	-
pg_om_sp2	204	192.168.100.0	/29	Private	OAM VIP link	-
pg_om_sp1	184	<PG_OM_SP1_NW>	/29	Public <sup>(1)</sup>	-	-
BSP_NBI	4054	<BSP_NBI_NW>	/29	Public <sup>(1)</sup>	External address for System OAM	-
-	-	<VIP-TRAFFIC-IP>	/32	Public <sup>(1)</sup>	VIP address Traffic	OSPF advertised VIP
-	-	<VIP-OAM-IP>	/32	Public <sup>(1)</sup>	VIP address OAM	OSPF advertised VIP
<b>With VRRP Setup</b>						
prov_om_cn	<PROV_OM_CN_VID>	PROV_OM_CN	/29	Public <sup>(1)</sup>	Traffic uplink CMX-0-26 and CMX-0-28	Active - standby configuration using VRRP
om_cn_sp	<OM_CN_SP_VID>	OM_CN_SP	/29	Public <sup>(1)</sup>	OAM uplink CMX-0-26 and CMX-0-28	Active - standby configuration using VRRP
<b>With BFD Setup</b>						

VLAN Name	VLAN ID	Subnet	Mask	Type	Use	Comments
prov_om_cn	<PROV_OM_CN_VID>	PROV_OM_CN	/29	Public <sup>(1)</sup>	Traffic uplink CMX-0-26 and CMX-0-28	Active - active configuration using BFD
om_cn_sp	<OM_CN_SP_VID>	OM_CN_SP	/29	Public <sup>(1)</sup>	OAM uplink CMX-0-26 and CMX-0-28	Active - active configuration using BFD

*(1) IP addresses used to reach the system from the customer network. Addresses are selected during site integration, see Section 2 on page 5.*





## 3 IP Connectivity

This section covers IP connectivity.

### 3.1 IP Address Assignments

In this section internal IP addresses are assigned.

#### 3.1.1 Backplane

The following table shows the backplane VLAN connectivity.

ETH5 and ETH6 are bonded together, acting as one interface named bond0.

*Table 3 Backplane Connectivity*

IP Address	System	Interface	Comment
169.254.100.0/24	Network		
.1	SC-1	bond0	
.2	SC-2	bond0	
.3	PL-3	bond0	
.4	PL-4	bond0	
.5	PL-5	bond0	
.6	PL-6	bond0	
.7	PL-7	bond0	
.8	PL-8	bond0	
.9	PL-9	bond0	
.10	PL-10	bond0	
.11	PL-11	bond0	
.12	PL-12	bond0	
.101	SC-1 SC-2	bond0:1	NFS, movable IP address <sup>(1)</sup>
.253	CMX-0-26	BP1, BP3, ..., BP23, E3, E4	E3 and E4 corresponds to LA1
.254	CMX-0-28	BP1, BP3, ..., BP23, E3, E4	E3 and E4 corresponds to LA1
.255	Broadcast		

(1) See **LDE Management Guide Reference [4]** for further explanation.



### 3.1.2 Boot Network

According to connection rules for the blades defined in Linux™ Distribution Extensions with SUSE (LDEwS) configuration, ETH3 and ETH4 are used as boot interface.

### 3.1.3 OSPF Backbone

The following table shows the OSPF backbone connectivity.

*Table 4 OSPF Backbone*

IP Address	System	Interface	Virtual Router
192.168.208.1/32	CMX-0-26	Loopback	om_cn_sp
192.168.208.2/32	CMX-0-28	Loopback	om_cn_sp
192.168.208.13/32	CMX-0-26	Loopback	prov_cn_sp
192.168.208.14/32	CMX-0-28	Loopback	prov_cn_sp

### 3.1.4 PG\_PROV\_SP1

The following table shows the pg\_prov\_sp1 connectivity.

*Table 5 PG\_PROV\_SP1*

IP Address	System	Interface	Comment	Virtual Router
192.168.101.0/29	Network		Used by OSPF	prov_cn_sp
.1	CMX-0-26			
.2	CMX-0-28			
.3	PL-3	bond0.104		
.4	PL-4	bond0.104		
.7	Broadcast			

### 3.1.5 PG\_OM\_SP2

The following table shows the pg\_om\_sp2 connectivity.



*Table 6 PG\_OM\_SP2*

IP Address	System	Interface	Comment	Virtual Router
192.168.100 .0/29	Network		Used by OSPF	om_cn_sp
.1	CMX-0-26			
.2	CMX-0-28			
.3	SC-1	bond0.204		
.4	SC-2	bond0.204		
.7	Broadcast			





## 4 Network Equipment

This section describes the configuration of the switches and routers used throughout the solution.

### 4.1 VLAN Design

This section contains needed VLANs on network equipments.

#### 4.1.1 SCX-0-0

*Table 7 VLAN Assignments, SCX-0-0*

VLAN Name	VLAN ID	Tagged Ports	Untagged Ports
pg_boot_pdl	4004	None	BP1, ... BP23
pg_Control-L	54	BP1, ... BP23, BP26, BP28, LOCALHOST, REMOTEHOST	None
BSP_NBI	4054	E3, LOCALHOST, REMOTEHOST	None

#### 4.1.2 SCX-0-25

*Table 8 VLAN Assignments, SCX-0-25*

VLAN Name	VLAN ID	Tagged Ports	Untagged Ports
pg_boot_pdr	4014	None	BP1, ... BP23
pg_Control-R	64	BP1, ... BP23, BP26, BP28, LOCALHOST, REMOTEHOST	None
BSP_NBI	4054	E3, LOCALHOST, REMOTEHOST	None

#### 4.1.3 CMX-0-26 VRRP

*Table 9 VLAN Assignments, CMX-0-26 Using VRRP*

VLAN Name	Interface Address	VLAN ID	Untagged Ports	Tagged Ports	Protocol	Virtual Router
pg_lde_sp	169.254.100.253	4024	BP1, BP3, ..., BP23	LA1 (E3, E4)	-	-
pg_om_sp2	192.168.100.1	204	-	LA1, BP1, BP3	OSPF stub 10.0.0.4	om_cn_sp



VLAN Name	Interface Address	VLAN ID	Untagged Ports	Tagged Ports	Protocol	Virtual Router
pg_prov_sp1	192.168.101.1	104	-	LA1, BP5, BP7	OSPF stub 10.0.0.5	prov_cn_sp
prov_om_cn	<PROV_OM_CN_CMX_0_26_IP>	<PROV_OM_CN_VID> <sup>(1)</sup>	-	E7 or GE2	VRRP-Master	prov_cn_sp
om_cn_sp	<OM_CN_SP_CMX_0_26_IP>	<OM_CN_SP_VID> <sup>(2)</sup>	-	E7 or GE4	VRRP-Master	om_cn_sp
pg_om_sp1	<PG_OM_SP1_CMX_0_26_IP>	184	-	LA1 (E3,E4), BP1, BP3,	VRRP-Master	om_cn_sp
BSP_NBI	<BSP_NBI_CMX_0_26_IP>	4054	-	LA1, E5	VRRP-Master	om_cn_sp

(1) The same VLAN ID as for <PROV\_OM\_CN\_VID> in CMX-0-28

(2) The same VLAN ID as for <OM\_CN\_SP\_VID> in CMX-0-28

#### 4.1.4

#### CMX-0-28 VRRP

Table 10 VLAN Assignments, CMX-0-28 Using VRRP

VLAN Name	Interface Address	VLAN ID	Untagged Ports	Tagged Ports	Protocol	Virtual Router
pg_lde_sp	169.254.100.254	4024	BP1, BP3, ..., BP23	LA1 (E3,E4)	-	-
pg_om_sp2	192.168.100.2	204	-	LA1, BP1, BP3	OSPF stub 10.0.0.4	om_cn_sp
pg_prov_sp1	192.168.101.2	104	-	LA1, BP5, BP7	OSPF stub 10.0.0.5	prov_cn_sp
prov_om_cn	<PROV_OM_CN_CMX_0_28_IP>	<PROV_OM_CN_VID> <sup>(1)</sup>	-	E7 or GE2	VRRP-Master	prov_cn_sp
om_cn_sp	<OM_CN_SP_CMX_0_28_IP>	<OM_CN_SP_VID> <sup>(2)</sup>	-	E7 or GE4	VRRP-Master	om_cn_sp
pg_om_sp1	<PG_OM_SP1_CMX_0_28_IP>	184	-	LA1 (E3,E4), BP1, BP3,	VRRP-Master	om_cn_sp
BSP_NBI	<BSP_NBI_CMX_0_28_IP>	4054	-	LA1, E5	VRRP-Master	om_cn_sp

(1) The same VLAN ID as for <PROV\_OM\_CN\_VID> in CMX-0-26

(2) The same VLAN ID as for <OM\_CN\_SP\_VID> in CMX-0-26



#### 4.1.5

#### CMX-0-26 BFD

Table 11 VLAN Assignments, CMX-0-26 Using BFD

VLAN Name	Interface Address	VLAN ID	Untagged Ports	Tagged Ports	Protocol	Virtual Router
pg_lde_sp	169.254.100.253	4024	BP1, BP3, ..., BP23	LA1 (E3,E4)	-	-
pg_om_sp2	192.168.100.1	204	-	LA1, BP1, BP3	OSPF stub 10.0.0.4	om_cn_sp
pg_prov_sp1	192.168.101.1	104	-	LA1, BP5, BP7	OSPF stub 10.0.0.5	prov_cn_sp
prov_om_cn	<PROV_OM_CN_CM_X_0_26_IP>	<PROV_OM_CN_VID> <sup>(1)</sup>	-	E7 or GE2	BFD	prov_cn_sp
om_cn_sp	<OM_CN_SP_CM_X_0_26_IP>	<OM_CN_SP_VID> <sup>(2)</sup>	-	E7 or GE4	BFD	om_cn_sp
pg_om_sp1	<PG_OM_SP1_CM_X_0_26_IP>	184	-	LA1 (E3,E4), BP1, BP3,	VRRP-Master	om_cn_sp
BSP_NBI	<BSP_NBI_CM_X_0_26_IP>	4054	-	LA1, E5	VRRP-Master	om_cn_sp

(1) The same VLAN ID as for <PROV\_OM\_CN\_VID> in CMX-0-28

(2) The same VLAN ID as for <OM\_CN\_SP\_VID> in CMX-0-28

#### 4.1.6

#### CMX-0-28 BFD

Table 12 VLAN Assignments, CMX-0-28 Using BFD

VLAN Name	Interface Address	VLAN ID	Untagged Ports	Tagged Ports	Protocol	Virtual Router
pg_lde_sp	169.254.100.254	4024	BP1, BP3, ..., BP23	LA1 (E3,E4)	-	-
pg_om_sp2	192.168.100.2	204	-	LA1, BP1, BP3	OSPF stub 10.0.0.4	om_cn_sp
prov_cn_sp1	192.168.101.2	104	-	LA1, BP5, BP7	OSPF stub 10.0.0.5	prov_cn_sp
prov_om_cn	<PROV_OM_CN_CM_X_0_28_IP>	<PROV_OM_CN_VID> <sup>(1)</sup>	-	E7 or GE2	BFD	prov_cn_sp
om_cn_sp	<OM_CN_SP_CM_X_0_28_IP>	<OM_CN_SP_VID> <sup>(2)</sup>	-	E7 or GE4	BFD	om_cn_sp



VLAN Name	Interface Address	VLAN ID	Untagged Ports	Tagged Ports	Protocol	Virtual Router
pg_om_sp1	<PG_OM_SP1_CMX_0_28_IP>	184	-	LA1 (E3,E4), BP1, BP3,	VRRP-Master	om_cn_sp
BSP_NBI	<BSP_NBI_CM_X_0_28_IP>	4054	-	LA1, E5	VRRP-Master	om_cn_sp

(1) The same VLAN ID as for <PROV\_OM\_CN\_VID> in CMX-0-26

(2) The same VLAN ID as for <OM\_CN\_SP\_VID> in CMX-0-26

## 4.2 Static Routing

The CMXs are configured with static routing for BFD and VRRP.

### 4.2.1 Static Routing BFD CMX-0-26

Table 13 CMX-26 BFD Static Routing

Virtual Router (VR)	Destination	Nexthop	Description
prov_cn_sp	0.0.0.0/0	<PROV_OM_CN_CMX_0_26_CE0_GW_IP>	Primary default gateway for provisioning traffic
		<PROV_OM_CN_CMX_0_28_CE1_GW_IP>	Backup default gateway for provisioning traffic
		192.168.208.10	Backup default gateway via CMX-0-28 for provisioning traffic
	<VIP-TRAFFIC-IP>/32	192.168.208.10	Backup route to VIP-TRAFFIC-IP via CMX-0-28
om_cn_sp	0.0.0.0/0	<OM_CN_SP_CMX_0_26_CE0_GW_IP>	Primary default gateway for NTP/DNS, SNMP and OAM traffic
		<OM_CN_SP_CMX_0_28_CE1_GW_IP>	Backup default gateway for NTP/DNS, SNMP and OAM traffic
		192.168.209.10	Backup default gateway via CMX-0-28 for NTP/DNS, SNMP and OAM traffic
	<VIP-OAM-IP>/32	192.168.209.10	Backup route to VIP-OAM-IP via CMX-0-28



## 4.2.2 Static Routing BFD CMX-0-28

Table 14 CMX-28 BFD Static Routing

Virtual Router (VR)	Destination	Nexthop	Description
prov_cn_sp	0.0.0.0/0	<PROV_OM_CN_CMX_0_26_CE0_GW_IP>	Primary default gateway for provisioning traffic
		<PROV_OM_CN_CMX_0_28_CE1_GW_IP>	Backup default gateway for provisioning traffic
		192.168.208.9	Backup default gateway via CMX-0-26 for provisioning traffic
	<VIP-TRAFFIC-IP>/32	192.168.208.9	Backup route to VIP-TRAFFIC-IP via CMX-0-26
om_cn_sp	0.0.0.0/0	<OM_CN_SP_CMX_0_26_CE0_GW_IP>	Primary default gateway for NTP/DNS, SNMP and OAM traffic
		<OM_CN_SP_CMX_0_28_CE1_GW_IP>	Backup default gateway for NTP/DNS, SNMP and OAM traffic
		192.168.209.9	Backup default gateway via CMX-0-26 for NTP/DNS, SNMP and OAM traffic
	<VIP-OAM-IP>/32	192.168.209.9	Backup route to VIP-OAM-IP via CMX-0-26

## 4.2.3 Static Routing VRRP CMX-0-26

Table 15 CMX-26 BFD Static Routing

Virtual Router (VR)	Destination	Nexthop	Description
prov_cn_sp	0.0.0.0/0	<PROV_OM_CN_VRRP_GW_IP>	Primary default gateway for provisioning traffic
		192.168.208.10	Backup default gateway via CMX-0-28 for provisioning traffic
	<VIP-TRAFFIC-IP>/32	192.168.208.10	Backup route to VIP-TRAFFIC-IP via CMX-0-28
om_cn_sp	0.0.0.0/0	<OM_CN_SP_VRRP_GW_IP>	Primary default gateway for NTP/DNS, SNMP and OAM traffic via CMX-0-28
		192.168.209.10	Backup default gateway via CMX-0-28 for NTP/DNS, SNMP and OAM traffic
	<VIP-OAM-IP>/32	192.168.209.10	Backup route to VIP-OAM-IP via CMX-0-28



## 4.2.4 Static Routing VRRP CMX-0-28

Table 16 CMX-28 BFD Static Routing

Virtual Router (VR)	Destination	Nexthop	Description
prov_cn_sp	0.0.0.0/0	<PROV_OM_CN_VRRP_GW_IP>	Primary default gateway for provisioning traffic
		192.168.208.9	Backup default gateway via CMX-0-26 for provisioning traffic
	<VIP-TRAFFIC-IP>/32	192.168.208.9	Backup route to VIP-TRAFFIC-IP via CMX-0-26
om_cn_sp	0.0.0.0/0	<OM_CN_SP_VRRP_GW_IP>	Primary default gateway for NTP/DNS, SNMP and OAM traffic via CMX-0-26
		192.168.209.9	Backup default gateway via CMX-0-26 for NTP/DNS, SNMP and OAM traffic
	<VIP-OAM-IP>/32	192.168.209.9	Backup route to VIP-OAM-IP via CMX-0-26

## 4.3 Dynamic Routing

The CMXs are configured with dynamic routing protocol Open Shortest Path First (OSPF) for:

- Advertising of <VIP-OAM-IP> by VIP to CMX-0-26 and CMX-0-28
- Advertising of <VIP-TRAFFIC-IP> by VIP to CMX-0-26 and CMX-0-28
- Propagation of inter area backup routes between CMX-0-26 and CMX-0-28 and for OSPF export of static default route through area 0.0.0.0
- Advertising default routes from CMX-0-26 and CMX-0-28 routers to SC-1 and SC-2 in OSPF area 10.0.0.4 and to PL-3 and PL-4 in OSPF area 10.0.0.5

### 4.3.1 OSPF Area 0.0.0.0

The following table shows the OSPF settings that apply for both CMXs.

Table 17 OSPF Parameters

OSPF Parameter	Value
Router ID	CMX-0-26: 192.168.101.1 PROV_CN_SP
	CMX-0-28: 192.168.101.2 PROV_CN_SP
	CMX-0-26: 192.168.100.1 OM_CN_SP
	CMX-0-28: 192.168.100.2 OM_CN_SP
Link Types	Point to point





OSPF Parameter	Value
Hello timer	3 s
Dead timer	9 s
MD5 Authentication	No

### 4.3.2 OSPF Stub Area 10.0.0.5: VIP Traffic

The following table shows the VIP Traffic OSPF settings that apply for both CMXs.

*Table 18 OSPF Stub Area 10.0.0.5: VIP Traffic*

OSPF Parameter	Value
Area type	Stub
Active interfaces	CMX-0-26:vlan1.104
	CMX-0-28:vlan1.104

### 4.3.3 OSPF Stub Area 10.0.0.4: VIP OAM

The following table shows the VIP OAM OSPF settings that apply for both CMXs.

*Table 19 OSPF Stub Area 10.0.0.4: VIP OAM*

OSPF Parameter	Value
Area type	Stub
Active interfaces	CMX-0-26:vlan1.204
	CMX-0-28:vlan1.204





## 5 Example Configurations for External IP Addresses

The following sections shows examples of external addresses used in a VRRP or BFD network configuration setups.

### 5.1 External Addresses in VRRP Setup

This section specifies examples of external addresses that are used in VRRP network configuration setup.

*Table 20 VRRP Setup, Example External Addresses*

IP address	Mask	Configuration tag	Comments
Traffic VLAN: “PROV_OM_CN”			
10.138.7.0	/29	-	System Traffic uplink network, PROV_OM_CN.
.1		<PROV_OM_CN_VRRP_GW_IP>	VRRP address used as gateway for provisioning traffic towards Network Elements.
.4		<PROV_OM_CN_VRRP_IP>	VRRP address used as Gateway for customer network for provisioning traffic towards Dynamic Activation system.
.5		<PROV_OM_CN_CMX_0_26_IP>	IP address on CMX-0-26 port E7/GE2.
.6		<PROV_OM_CN_CMX_0_28_IP>	IP address on CMX-0-28 port E7/GE2.
2700		<PROV_OM_CN_VID>	VLAN ID for PROV_OM_CN to be defined in both CMX-0-26, CMX-0-28 and customer network equipment.
250		<PROV_OM_CN_VRRP_VRID>	Virtual Router Identifier Must not be the same as the VRRP-VRID in customer equipment.
OAM VLAN: “OM_CN_SP”			



IP address	Mask	Configuration tag	Comments
10.138.7.8	/29	-	System OAM uplink network, OM_CN_SP.
.9		<OM_CN_SP_VRRP_GW_IP>	VRRP address used as gateway for OAM traffic.
.12		<OM_CN_SP_VRRP_IP>	VRRP address used as Gateway for customer network for OAM traffic towards Dynamic Activation system.
.13		<OM_CN_SP_CMX_0_26_IP>	IP address on CMX-0-26 port E7/GE4.
.14		<OM_CN_SP_CMX_0_28_IP>	IP address on CMX-0-28 port E7/GE4.
2701		<OM_CN_SP_VID>	VLAN ID for OM_CN_SP to be defined in both CMX-0-26, CMX-0-28 and customer network equipment.
251		<OM_CN_SP_VRRP_VRID>	Virtual Router Identifier Must not be the same as the VRRP-VRID in customer equipment.

## 5.2 External Addresses in BFD Setup

This section specifies examples of external addresses that are used in BFD network configuration setup.

*Table 21 BFD Setup, Example External Addresses*

IP address	Mask	Configuration tag	Comments
BFD Traffic VLAN: “PROV_OM_CN”			
10.138.10.0	/29	-	The network that holds the provisioning traffic to and from the CMX-0-26.
.1		<PROV_OM_CN_CMX_0_26_CE0_GW_IP>	Default gateway used for outgoing provisioning traffic towards Network Elements.
.2		<PROV_OM_CN_CMX_0_26_IP>	Gateway for customer network for traffic towards Dynamic Activation on CMX-0-26. Cable is connected to CMX-0-26 port E7/GE2.
.3		<PROV_OM_CN_CMX_0_28_CE1_GW_IP>	Default Gateway used for outgoing provisioning traffic towards Network Elements.
.4		<PROV_OM_CN_CMX_0_28_IP>	Gateway for customer network for traffic towards Dynamic Activation on CMX-0-28. Cable is connected to CMX-0-28 port E7/GE2.
2900		<PROV_OM_CN_VID>	VLAN ID for Virtual Router PROV_CN_SP to be defined both in CMX and customer equipment.
BFD OAM VLAN: “OM_CN_SP”			



IP address	Mask	Configuration tag	Comments
10.138.10.8	/29	-	The network that holds the OAM traffic to and from the CMX-0-26.
.9		<OM_CN_SP_CMX_0_26_CE0_GW_IP>	Default gateway used as gateway for OAM Traffic.
.10		<OM_CN_SP_CMX_0_26_IP>	Gateway for customer network for OAM towards Dynamic Activation on CMX-0-26. Cable is connected to CMX-0-26 port E7/GE4.
.11		<OM_CN_SP_CMX_0_28_CE1_GW_IP>	Default gateway used as gateway for OAM Traffic.
.12		<OM_CN_SP_CMX_0_28_IP>	Gateway for customer network for OAM towards Dynamic Activation on CMX-0-28. Cable is connected to CMX-0-28 port E7/GE4.
2901		<PROV_OM_CN_VID>	VLAN ID for Virtual Router OM_CN_SP to be defined both in CMX and customer equipment.

### 5.3 External Addresses in VRRP and BFD Setup

This section specifies examples of external addresses that are used in both VRRP and BFD network configuration setups.

*Table 22 VRRP and BFD Setup, Example External Addresses*

IP address	Mask	Configuration tag	Comments
SYSOAM vlan: "PG_OM_SP1"			
10.138.8.0	/29	<PG_OM_SP1_NW>	The SYSOAM network that handles OAM traffic such as SSH and SNMP.
.1		<PG_OM_SP1_VRRP_IP >	VRRP address for outgoing OAM traffic.
.2		<PG_OM_SP1_CMX_0_26_IP>	External IP-address CMX-0-26.
.3		<PG_OM_SP1_CMX_0_28_IP>	External IP-address CMX-0-28.
.4		<PG_OM_SP1_SC_1_IP >	External address SC1.
.5		<PG_OM_SP1_SC_2_IP >	External address SC2.
Collapsed northbound: "BSP_NBI"			



IP address	Mask	Configuration tag	Comments
10.138.9.0	/29	<BSP_NBI_NW>	Network for collapsed northbound, DMXC access.
.1		<BSP_NBI_VRRP_IP>	VRRP address for outgoing DMXC management traffic.
.2		<BSP_NBI_CMX_0_26_IP>	IP-address CMX-0-26 in VLAN BSP_NBI
.3		<BSP_NBI_CMX_0_28_IP>	IP-address CMX-0-28 in VLAN BSP_NBI
.4		<BSP_NBI_IP>	External collapsed northbound DMXC IP.
VIPs			
10.138.7.130	/32	<VIP-TRAFFIC-IP>	VIP-TRAFFIC is reachable from the customer network via PROV_CN_SP_VRRP_IP in the VRRP solution and via PROV_CN_SP_CMX_0_26/PROV_CN_SP_CMX_0_28 in the BFD solution. Set up routes in the customer network for this.
10.138.7.131	/32	<VIP-OAM-IP>	VIP-OAM-IP is reachable from the customer network via OM_CN_SP_VRRP_IP in the VRRP solution and via OM_CN_SP_CMX_0_26/OM_CN_SP_CMX_0_28 in the BFD solution. Set up routes in the customer network for this.
Customer network			
10.138.8.131	/32	<OSS-IP>	OSS IP in customer network.
164.48.54.35	/32	<DNS-SERVER-1-IP>	DNS server in customer network.
164.48.54.36	/32	<DNS-SERVER-2-IP>	DNS server in customer network.
164.48.54.37	/32	<NTP-SERVER-1-IP>	NTP server in customer network.
164.48.54.38	/32	<NTP-SERVER-2-IP>	NTP server in customer network.



## 6 Firewall Configuration

The configuration of Dynamic Activation IP tables is described in *System Administrators Guide for Native Deployment*, Reference [7]. If an external firewall is used, the same rules need to apply.







## 7 Files for Installation and Configuration

All files needed for installation and configuration of Dynamic Activation GEP3 or GEP5 are generated by the EDA Native BSP8100 Config Generator tool. For detailed information, see *Hardware Installation and IP Infrastructure Setup for Native Deployment GEP5*, Reference [5] if using GEP5, or, if using GEP3, *Hardware Installation and IP Infrastructure Setup for Native Deployment GEP3*, Reference [6].

### 7.1 eVIP Configuration

In the eVIP configuration file, the ports presented in the following tables are included by default.

See *eVIP on LSB Management Guide*, Reference [3] for details on eVIP configuration.

#### 7.1.1 eVIP Configuration for VIP-TRAFFIC

Table 23 eVIP Configuration Ports for VIP-TRAFFIC

Port	Address	Use
3010	<VIP-TRAFFIC-IP>	EDIFACT: Used for EDIFACT traffic.
3300	<VIP-TRAFFIC-IP>	Telnet: Used for CAI traffic.
3301	<VIP-TRAFFIC-IP>	Telnet: Used for CAI traffic.
8010	<VIP-TRAFFIC-IP>	Telnet: Used for MML traffic.
8080	<VIP-TRAFFIC-IP>	HTTP/TCP: Used for CAI3G traffic.
8111	<VIP-TRAFFIC-IP>	SSH: Used for MML traffic.
8181	<VIP-TRAFFIC-IP>	HTTPS/TCP: Used for CAI3G traffic.

#### 7.1.2 eVIP Configuration for VIP-OAM

Table 24 eVIP Configuration Ports for VIP-OAM

Port	Address	Use
22	<VIP-OAM-IP>	SSH: Used from OSS to, for example to fetch log files.
161	<VIP-OAM-IP>	SNMP: Used from OSS to access ESA, for example heartbeat SNMP Get.
7080	<VIP-OAM-IP>	HTTP/TCP: Used by the <code>cpc-module</code> for OAM GUI traffic.
7081	<VIP-OAM-IP>	HTTPS/TCP: Used by the <code>cpc-module</code> for OAM GUI traffic.
8023	<VIP-OAM-IP>	Telnet: Used for Massive CLI



Port	Address	Use
8099	<VIP-OAM-IP>	RMI: Used for JMX communication.
8282 <sup>(1)</sup>	<VIP-OAM-IP>	HTTP/TCP: Used for OAM GUI traffic.
8383	<VIP-OAM-IP>	HTTPS/TCP: Used for OAM GUI traffic.
8992	<VIP-OAM-IP>	Telnet: Used for Massive CLI with SSL
8994	<VIP-OAM-IP>	RMI: Used for JMX communication.

(1) The HTTP traffic is automatically redirected to HTTPS on port 8383 by tomcat.

## 8 Network Figures

This section contains a selection of figures describing the network connectivity. Main purpose of these is to highlight a particular network connectivity aspect. This overview is not exhaustive, it only shows the key configurations.

### 8.1 Internal Network Backplane

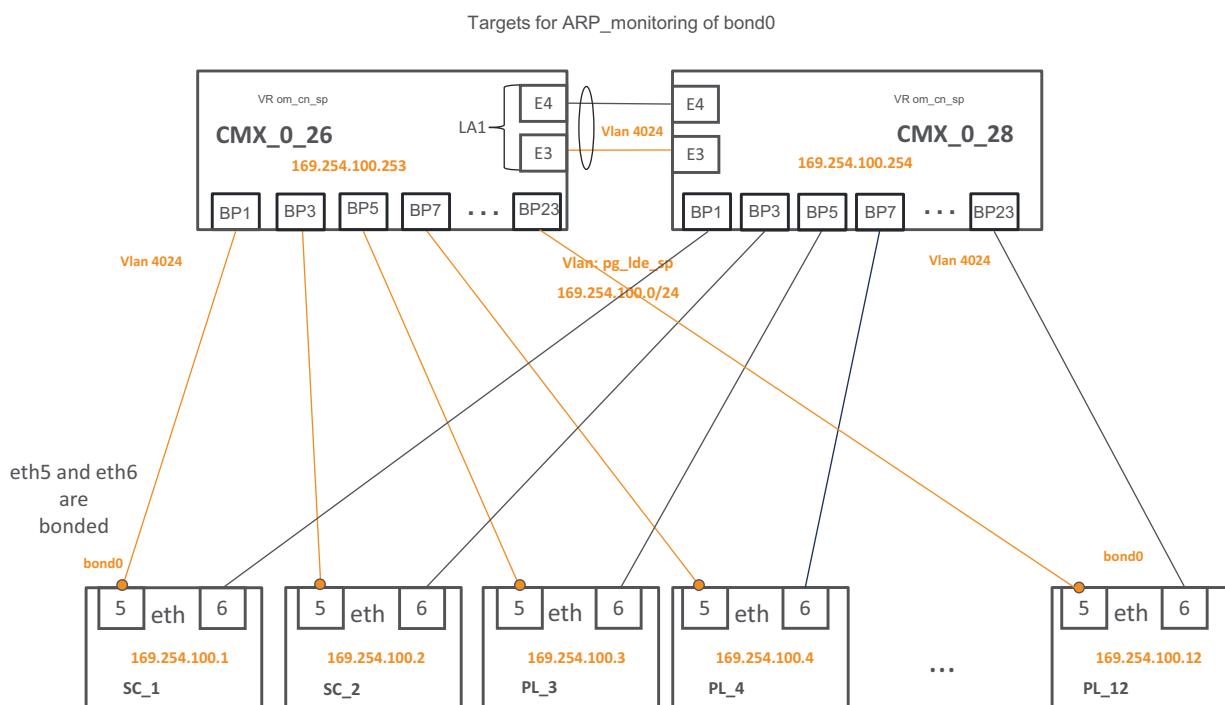


Figure 3 Internal Network, Backplane

The internal network VLAN backplane is used for application internal traffic.

## 8.2 VIP Traffic VRRP

CE – Customer Equipment  
SW – Site Switch

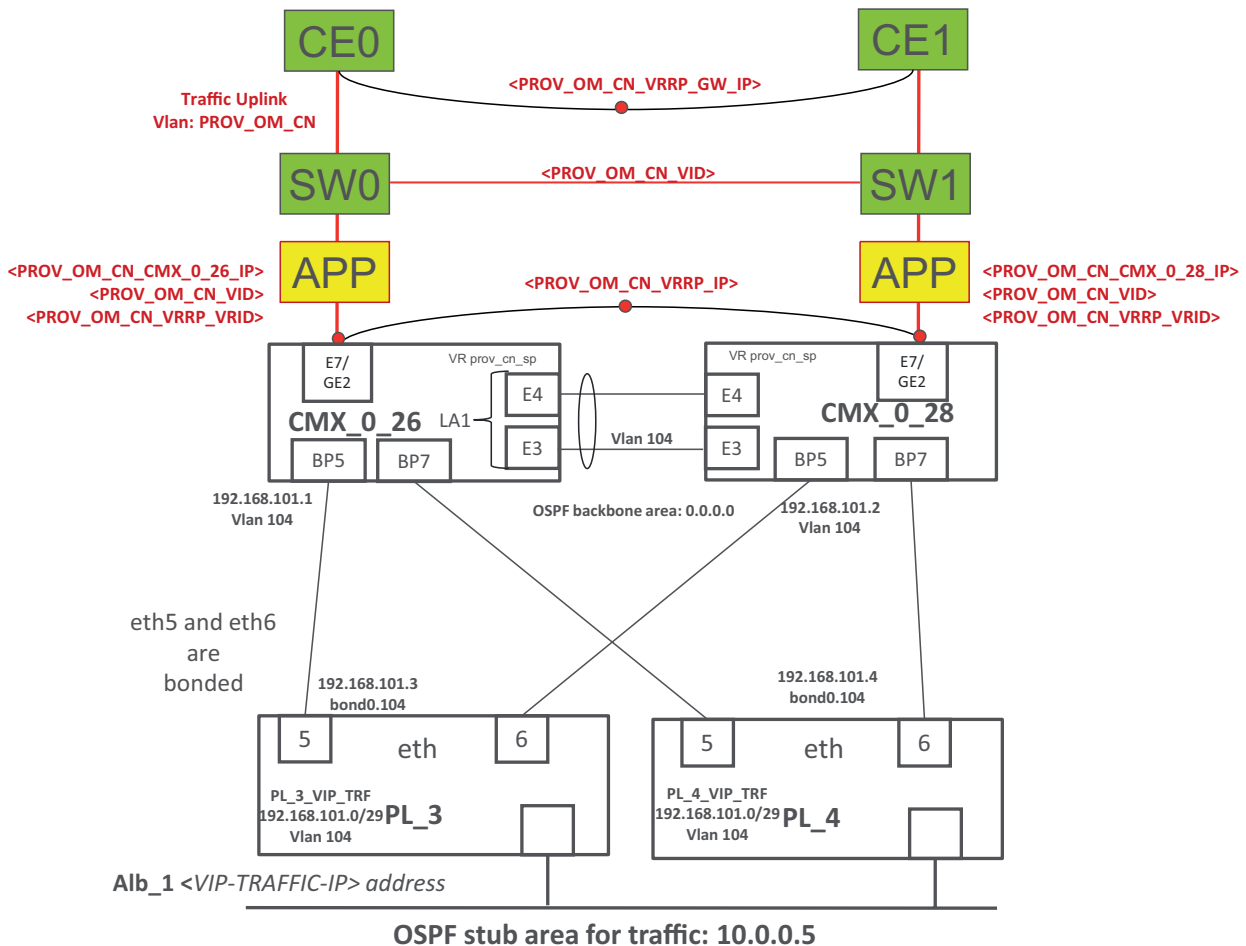


Figure 4 Payloads, VIP for Traffic VRRP

**Note:** Readability is improved when printed in color.

The figure depicts the cabling connection. If using one physical uplink cable, the uplink port for each CMX is E7, and the use of Active Patch Panel (APP) is mandatory. If using two physical uplink cables, the uplink port for each CMX is GE2.

The objects SW0, SW1, CE0 and CE1 are not part of a Dynamic Activation system and serve as examples of customer network equipment.

The VRRP setup requires that the VLAN with Id <PROV\_OM\_CN\_VID> is bridged in the customer network, this is depicted in the figure as the link between SW0 and SW1.

The <VIP-TRAFFIC-IP> is used for provisioning communication.



The customer network should be configured to route <VIP-TRAFFIC-IP> to Dynamic Activation <PROV\_OM\_CN\_VRRP\_IP> and the Dynamic Activation CMX-0-26 and CMX-0-28 are configured to route provisioning traffic to the customer network <PROV\_OM\_CN\_VRRP\_GW\_IP>.

## 8.3 VIP OAM VRRP

CE – Customer Equipment  
SW – Site Switch

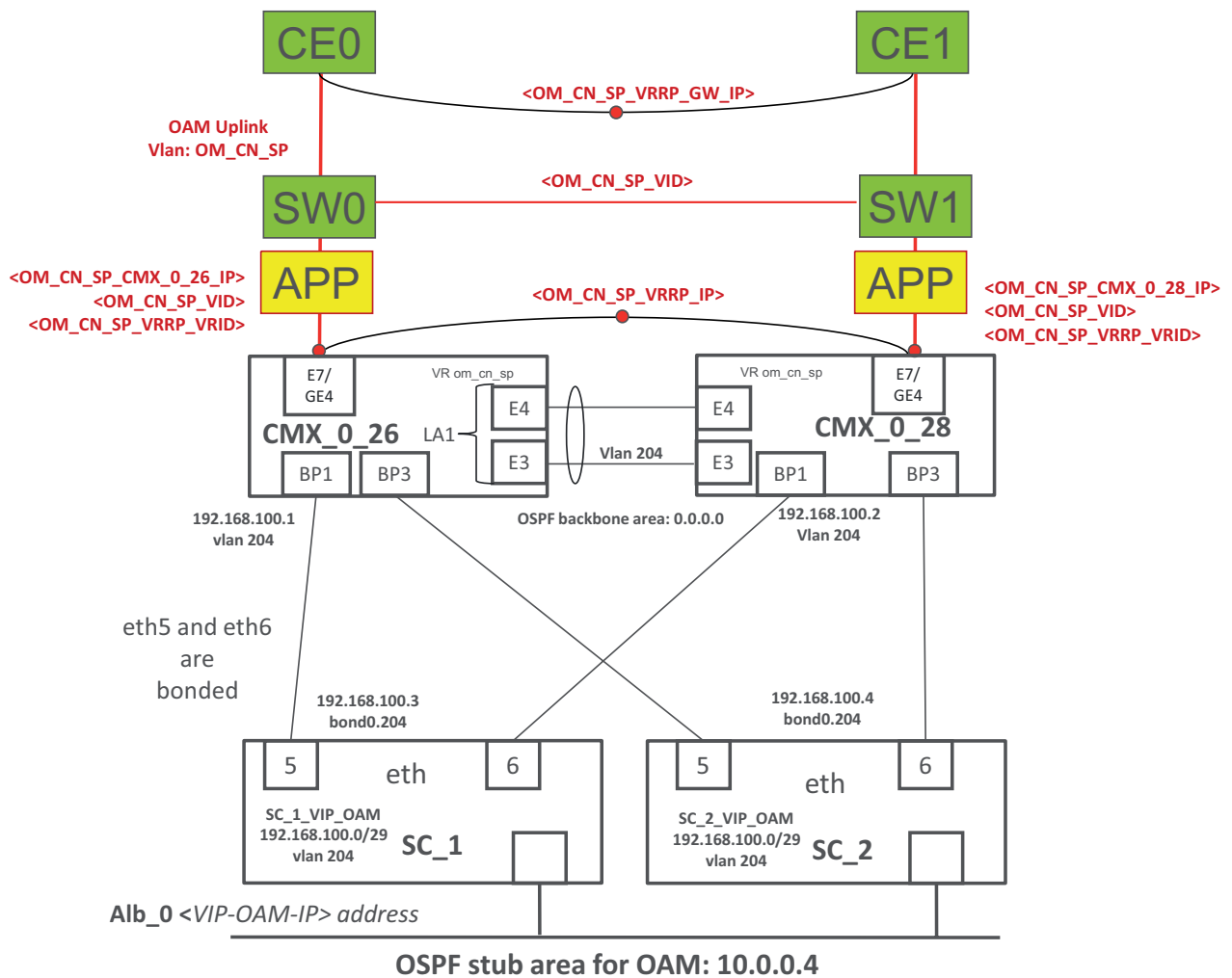


Figure 5 System Controllers, VIP for OAM VRRP

**Note:** Readability is improved when printed in color.

The figure depicts the cabling connection. If using one physical uplink cable, the uplink port for each CMX is E7, and the use of APP is mandatory. If using two physical uplink cables, the uplink port for each CMX is GE4.



The objects SW0, SW1, CE0 and CE1 are not part of a Dynamic Activation system and serve as examples of customer network equipment.

The VRRP setup requires that the VLAN with Id `<OM_CN_SP_VID>` is bridged in the customer network, this is depicted in the figure as the link between SW0 and SW1.

The `<VIP-OAM-IP>` is used as source in NTP communication and for OAM communication.

The customer network should be configured to route `<VIP-OAM-IP>` to Dynamic Activation `<OM_CN_SP_VRRP_IP>` and the Dynamic Activation CMX-0-26 and CMX-0-28 are configured with a default route for OAM traffic to the customer network `<OM_CN_SP_VRRP_GW_IP>`.





The customer network should be configured to route `<VIP-TRAFFIC-IP>` to `<PROV_OM_CN_CMX_0_26_IP>` and `<PROV_OM_CN_CMX_0_28_IP>`.

Dynamic Activation is configured to route provisioning traffic from CMX-0-26 to the customer network `<PROV_OM_CN_CMX_0_26_CEO_GW_IP>` and from CMX-0-28 to the customer network `<PROV_OM_CN_CMX_0_28_CEO_GW_IP>`.

## 8.5 VIP OAM BFD

CE – Customer Equipment  
SW – Site Switch

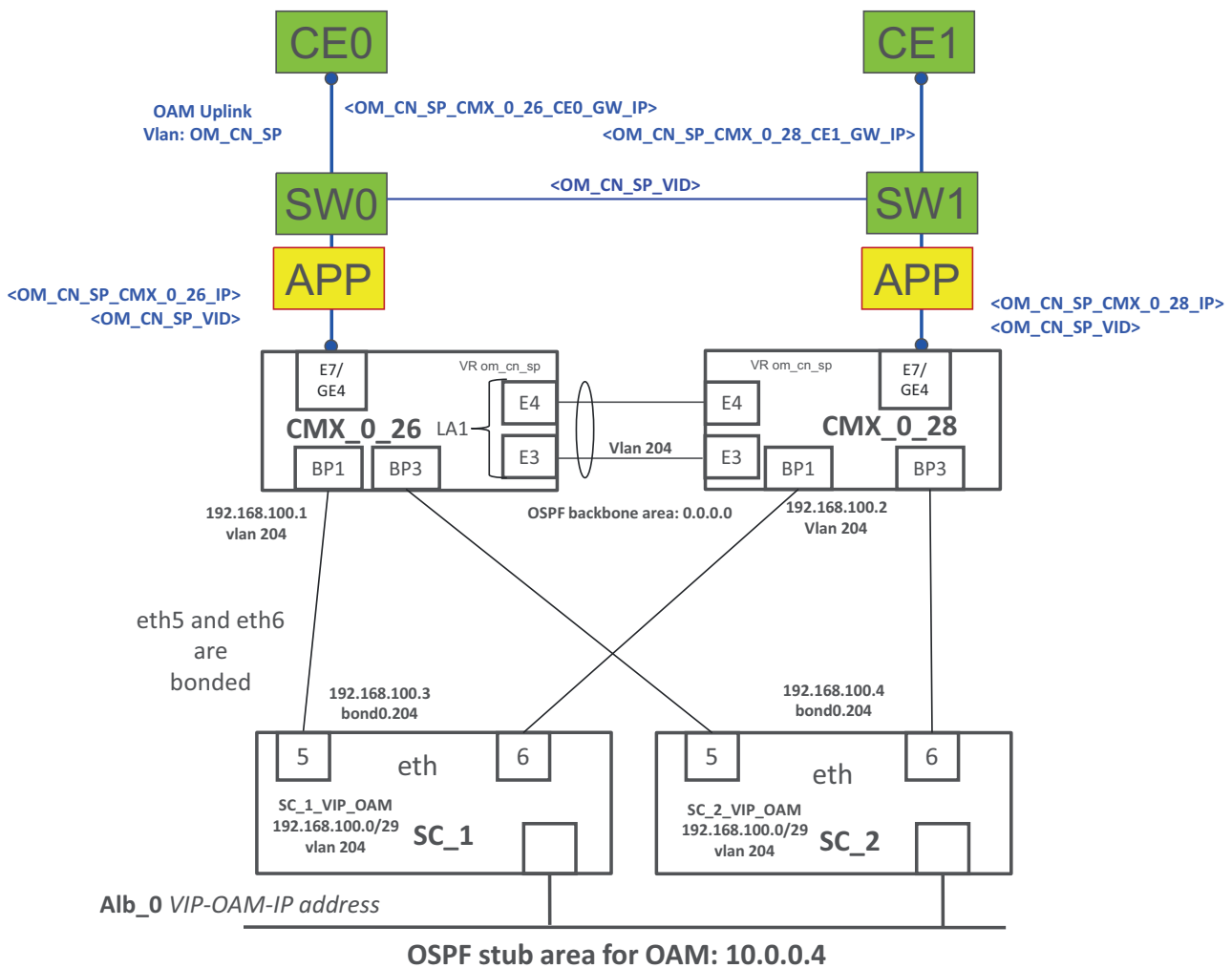


Figure 7 System Controllers, VIP for OAM BFD





**Note:** Readability is improved when printed in color.

The figure depicts the cabling connection. If using one physical uplink cable, the uplink port for each CMX is E7, and the use of APP is mandatory. If using two physical uplink cables, the uplink port for each CMX is GE4.

The objects SW0, SW1, CE0 and CE1 are not part of a Dynamic Activation system and serve as examples of customer network equipment.

The <VIP-OAM-IP> is used as source in NTP communication and for OAM communication.

The customer network should be configured to route <VIP-OAM-IP> to <OM\_CN\_SP\_CMX\_0\_26\_IP> and <OM\_CN\_SP\_CMX\_0\_28\_IP>.

Dynamic Activation is configured with a default route in CMX-0-26 to the customer network <OM\_CN\_SP\_CMX\_0\_26\_CE0\_GW\_IP> and in CMX-0-28 to the customer network <OM\_CN\_SP\_CMX\_0\_28\_CE1\_GW\_IP>.

## 8.6 BFD Routing Principle

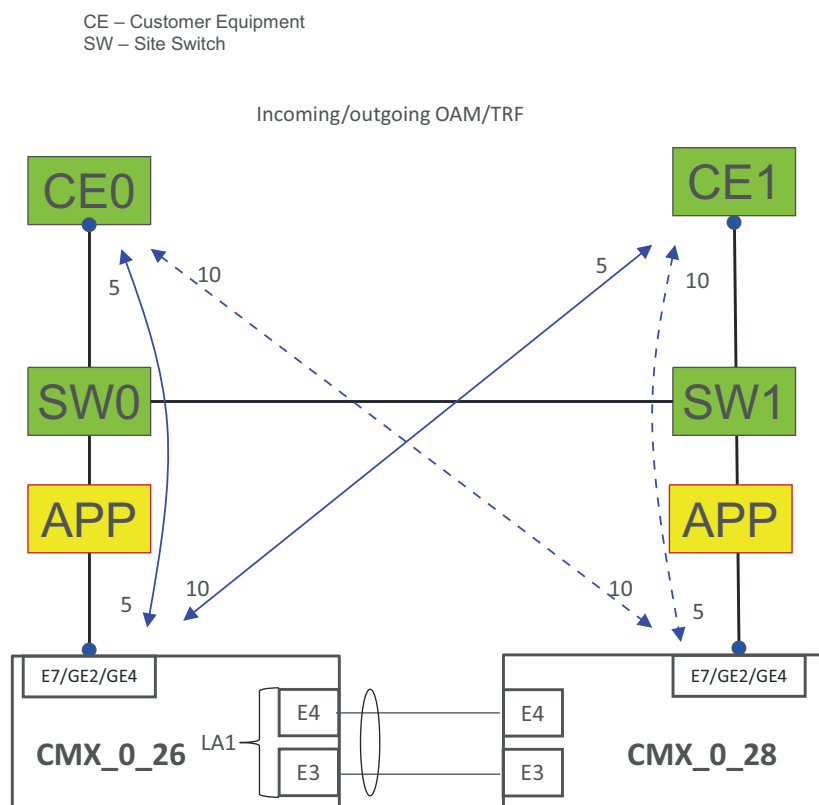


Figure 8 Overview BFD

The configuration setup for the BFD is according to the above figure. The dotted lines are backup routes in case of failure in the network. The routes are configured with a priority where the lowest number is the preferred one.

Incoming VIP traffic to CE0 should be routed down to CMX\_0\_26 with priority 5. The same goes for incoming traffic to CE1. This means all traffic will go through CMX\_0\_26 in steady state.

The outgoing traffic from Dynamic Activation will be routed back to CE0. For failure recovery cases see Reference [8].

## 8.7 PG\_OM\_SP1 Tenant Setup

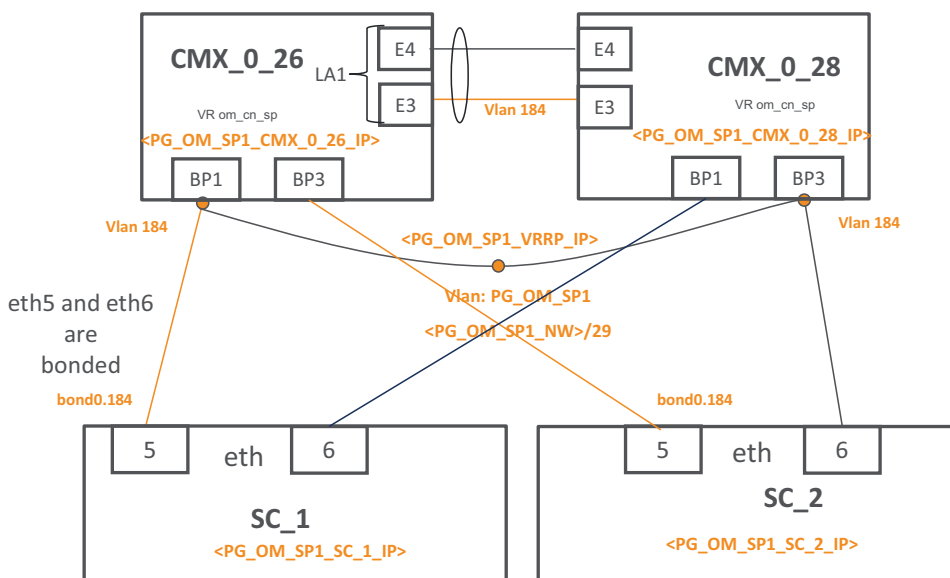


Figure 9 PG\_OM\_SP1 Tenant Setup

**Note:** Readability is improved when printed in color.

The PG\_OM\_SP1 network is used for accessing the control nodes of Dynamic Activation. The PG\_OM\_SP1 traffic enters and exits Dynamic Activation through CMX-0-26 or CMX-0-28 the same way as the <VIP-OAM-IP> traffic.

For VRRP the customer network should be configured to route PG\_OM\_SP1 to <OM\_CN\_SP\_VRRP\_IP>.

For BFD the customer network should be configured to route PG\_OM\_SP1 to <OM\_CN\_SP\_CMX\_0\_26\_IP> and <OM\_CN\_SP\_CMX\_0\_28\_IP>.

Dynamic Activation is configured with a default route in CMX-0-26 to the customer network <OM\_CN\_SP\_CMX\_0\_26\_CE0\_GW\_IP> and in CMX-0-28 to the customer network <OM\_CN\_SP\_CMX\_0\_28\_CE1\_GW\_IP>.



## 8.8 BSP\_NBI Network

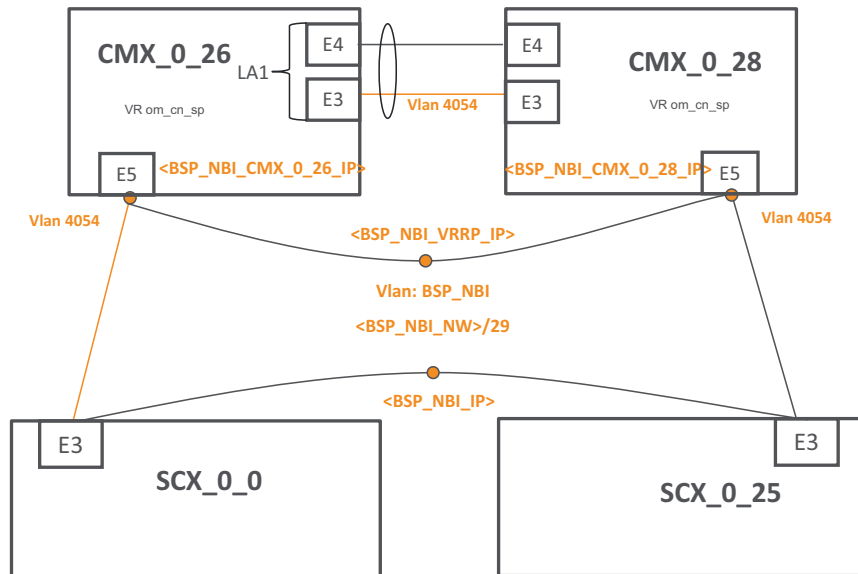


Figure 10 BSP\_NBI Overview

**Note:** Readability is improved when printed in color.

The BSP\_NBI network is used for accessing the BSP software. The BSP\_NBI traffic enters and exits Dynamic Activation through CMX-0-26 or CMX-0-28 the same way as the <VIP-OAM-IP> traffic.

For VRRP the customer network should be configured to route BSP\_NBI to <OM\_CN\_SP\_VRRP\_IP>.

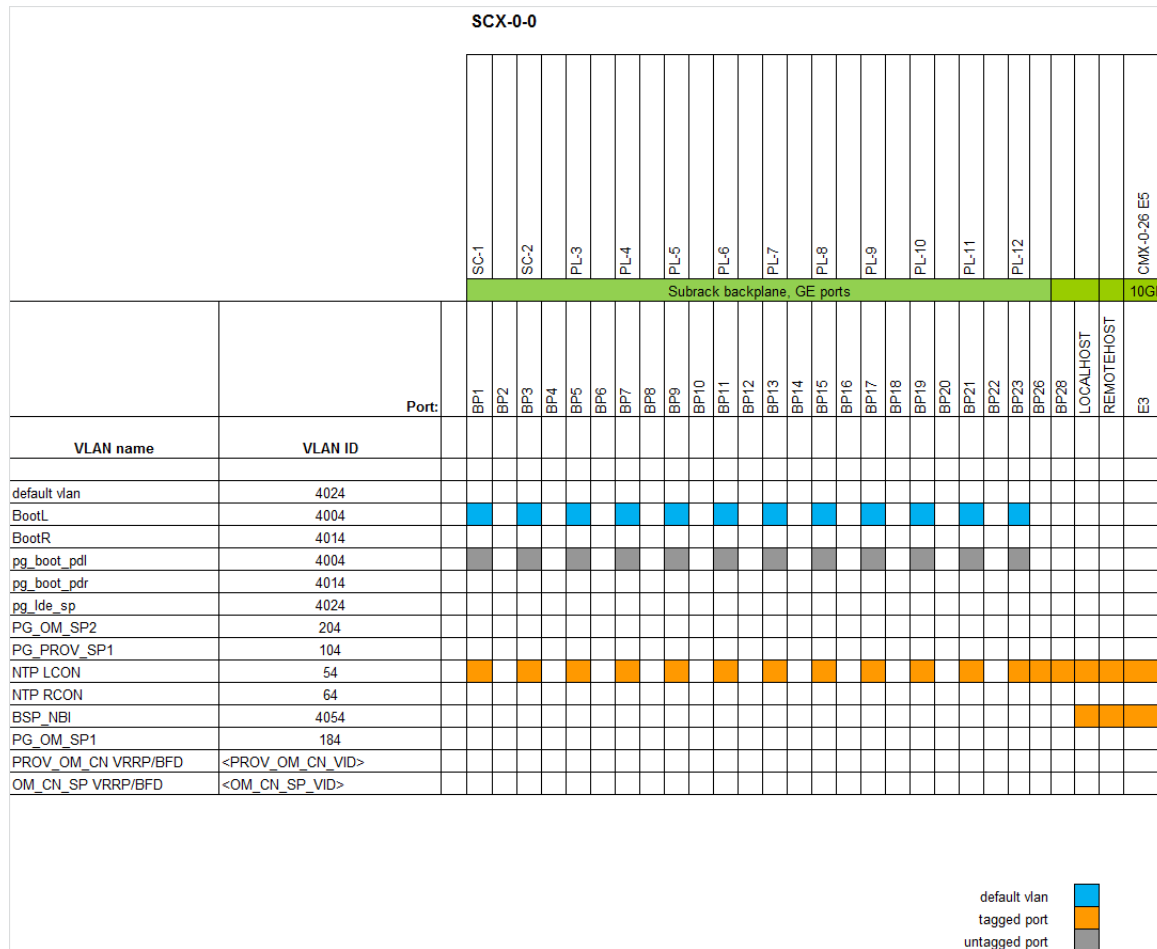
For BFD the customer network should be configured to route BSP\_NBI to <OM\_CN\_SP\_CMX\_0\_26\_IP> and <OM\_CN\_SP\_CMX\_0\_28\_IP>.

Dynamic Activation is configured with a default route in CMX-0-26 to the customer network <OM\_CN\_SP\_CMX\_0\_26\_CE0\_GW\_IP> and in CMX-0-28 to the customer network <OM\_CN\_SP\_CMX\_0\_28\_CE1\_GW\_IP>.



## 9

This section shows the switch configuration, VLANs, and ports in a graphical way.



*Figure 11 Port Overview of SCX-0-0*

[illegible]

*Figure 12 Port Overview of SCX-0-25*



CMX-0-26

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